

SARC - 3967
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16 February 1956

MEMORANDUM FOR: Project Director

SUBJECT: Progress Report No. 8, R-W System No. 3

1. Period covering 4 December 1955 thru 4 January 1956, data received 15 February 1956.

2. In this report Burt states that antenna design and impedance matching has progressed to the point where a full scale model of the nose section of the aircraft has been built and is being tested. The impedance matching requirements are expected to be a major problem. Due to a change in requirement (increase in listening time) Burt feels it is necessary to add automatic frequency control to the sweep circuits. This is being designed and will undergo tests during February. The test set is being designed and will include a frequency decade counter which will indicate frequency errors up to 350 kc. Burt feels this is adequate. Curves run on the new 400 cycle generator indicate that voltage regulation is much better than was expected. As a result a considerable weight reduction will be accomplished. Power dissipation also is no longer a problem. During the next month the major effort will be centered on converting the present bread board to a prototype model.

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NAK:aml (16 Feb 1956; rewritten 30 Feb 1956)

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- 2 - ☐ Master ✓
- 3 - ☐ Service
- 4 - Project Reading
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Monthly Progress Report No. 8

System No. 3

Contract No. A-101

4 December 1955 to 4 January 1956

CMCC Document No. 163.2024

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1-0. GENERAL. During the period covered by this report, modifications indicated by the results of testing were undertaken. These modifications had to do primarily with antenna impedance matching, power supply regulation, and signal lock-on.

2-0. ANTENNA.

2-1. Experiments indicated that the best impedance match between the antenna and a coaxial line of standard dimensions would not be satisfactory in itself. In addition, the impedance match between the line and the input to the preamplifier must be such as to not only maximize energy transfer, but must also be such as to produce a minimum noise figure. The decision was therefore made to match the antenna to a line and transform the line output to the minimum noise-figure impedance. Methods of achieving the desired results are now being investigated.

2-2. A full scale model of the nose section of the aircraft has been built and is being used for antenna impedance and system performance measurements. The impedance of the full-scale antenna corresponds to the impedance of the one-half scale model used previously. The full-scale model will continue to be used in conjunction with the impedance transformation problem.

3-0. R-F ASSEMBLY. An etched-board layout was completed, and a single board was fabricated which will include channels 1, 7 and 9. At present, tests are being made at channel 1 frequencies and deficiencies in the etched pattern layout were discovered. However, the existing board has been made to operate properly by means of some temporary fixes. During the next period the other two channels on the existing board will be wired in and tested, and a new etched pattern layout will be made for use on subsequent boards.

4-0. SECOND LOCAL-OSCILLATOR ASSEMBLY. Wiring of the prototype assembly has been completed.

5-0. SWEEP ASSEMBLY.

5-1. The revised requirements for the sweep assembly were studied and a tentative circuit was drawn up. This circuit will be subject to test and revision in the near future.

5-2. Due to the new requirement for increased listening time, it has been necessary to plan on adding automatic frequency control circuits to the sweep unit. A discriminator circuit which is to be located on the i-f assembly and which is to be part of the AGC system was given preliminary tests in breadboard form and operates satisfactorily. The remainder of the redesigned sweep assembly must be completed before it can be used in further tests.

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5-3. A timer circuit which will provide an increased lock-on period was also given preliminary tests.

6-0. TEST SET.

6-1. Originally, planning for the test set was based on a go, no-go indication. This system has been reconsidered and will be replaced by a decade counter display. Crystal-controlled test frequencies will be fed into the receiver at appropriate points. When the receiver has locked on the test frequency, the decade counter display will indicate frequency errors up to 350 kc in any of the local oscillators. Larger errors, or inoperative local-oscillator crystals, will result in no display.

6-2. General information on available standard transit cases is being collected. Sample cases have been requested. Blowers for the cooling system for test purposes are being investigated.

7-0. POWER SUPPLY. Curves were run on the new 400-cycle generator which is to be used in the aircraft and the regulation was found to be much better than expected. As a result, the voltage requirements of the receiver were reconsidered, especially with regard to voltage regulation. Because of changes planned in the sweep assembly circuits, regulation of the B supply need not be as close as originally planned. For this reason, it will now be possible to operate the system on plus and minus 130 volts dc from transformerless supplies, and on 6.3 v. ac, all unregulated. This will result in a considerable weight reduction and will reduce the heat dissipation problem.

8-0. RECEIVER. The design of the basic physical configuration of the unit has been fixed. A model of a typical plug-in circuit board and its associated shielding and mounting is being built.

9-0. PLANNING. During the next monthly interval, the major effort will continue to be concentrated on converting the breadboard model to prototype form.

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